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SCIENCE

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CONTENTS

<i>Horticulture as a Profession:</i> DR. C. STUART GAGER	293
<i>Letter on the Smithsonian Institution:</i> The late PROFESSOR LOUIS AGASSIZ	300
<i>Scientific Events:</i> —	
<i>Charles Leander Doolittle; Airplane Fuel; National Research Fellowships in Physics and Chemistry supported by the Rockefeller Foundation</i>	302
<i>Scientific Notes and News</i>	303
<i>University and Educational News</i>	307
<i>Discussion and Correspondence:</i> —	
<i>German Terms in Anatomy:</i> PROFESSOR FREDERIC T. LEWIS. <i>A Simple Covering Device for the Ocular of the Microscope:</i> DR. CLELL LEE METCALF. <i>Curious Differentiation in Frost Effects:</i> T. G. DABNEY.....	307
<i>Quotations:</i> —	
<i>How to Avoid Influenza</i>	311
<i>Scientific Books:</i> —	
<i>Cary's Life Zone Investigations in Wyoming:</i> DR. HARRY C. OBERHOLZER	312
<i>Special Articles:</i> —	
<i>A Chart of Organic Chemistry, Aliphatic Series:</i> DR. ALEXANDER LOWY	313

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HORTICULTURE AS A PROFESSION¹

THE advancement of civilization is marked by certain well-defined epochs. There are the old stone age and the new stone age, the age of bronze, the age of steam, the age of electricity. More recently events have moved forward with prodigious acceleration. We were no sooner beginning to think of the present as the age of the automobile, than the airplane rose above the horizon, and the age of flight was ushered in. The discovery of the telephone, the wireless telegraph and the wireless telephone would either of them have been of sufficient moment to give a name to a new epoch had they only been separated by sufficiently long intervals.

So it has been with the emancipation of woman. So-called "female seminaries" were followed shortly by women's colleges, and by coeducation in the liberal arts colleges of our universities. Finally the professional schools opened wide their doors, and we became accustomed to women lawyers, doctors, and engineers. The great world war disclosed the fact that there was one occupation essentially masculine, but the departure to France of some two million or more of our male population as fighters spelled Opportunity with a capital O for the daughters of men, and we have now become familiar with women munitions workers, women street-car conductors, women elevator "boys," and women messenger "boys."

Certainly we are living in an age of rapid

¹ Address to the graduating class of the School of Horticulture for Women, Ambler, Pa., December 13, 1918.

progress, and the oldest and most fundamental of all human pursuits—the cultivation of the soil—has not remained untouched. Just as agriculture is one of the oldest occupations of man, so, also, is it one of the oldest occupations of women. It was part of the business of the Indian squaw to scratch up the earth and plant and cultivate corn, while her lord and master was busy in the so-called "larger sphere" outside the home. We recall, with no particular feeling of pride in our species, the fact that in some countries women, as a matter of general practise, were yoked with the oxen in plowing. One particularly militant woman of my acquaintance has remarked that this lot was preferable to being yoked for life to the owner of the oxen!

But every concession is dangerous, unless one is prepared to go the entire logical length of the course. The modern man knows this only too well. Freedom of action outside the four walls of the home is a wonderfully broadening process, for woman as well as for man. If I can pull the plow with the ox, why might I not plan and supervise the work, and even own the ox, and the plow, and the farm? Nothing is more unsettling than questions unanswered; nothing is more enlightening than the pursuit of the answer; nothing is more convincing than the particular answer one very much wishes to find. Why, indeed?

The history of the intervening steps and struggles and advances is too long to be here reviewed, but we are all familiar with the results—the bill of rights, the declaration of independence, the emancipation proclamation, equal suffrage, and a seat in Congress. So I find myself, this afternoon, addressing the graduates of a school of horticulture for women.

In that charming forerunner of our modern popular books on gardening, "My Summer in a Garden," Charles Dudley

Warner makes the unguarded statement that "Women always did, from the first, make a muss in a garden." This poorly concealed reference to Eve and Eden was a mean fling, and I found myself saying, as I read it, that, if Charles Dudley Warner had been writing in 1918, he would have been more circumspect in his statements—especially if he had any thought of running for public office. But as I read on, I found that his wisdom and judgment had not wholly forsaken him, for he continues:

But I am not an alarmist . . . I am quite ready to say to Polly or to any other woman, "You can have the ballot; only leave me the vegetables." . . . But, I see how it is. Woman is now supreme in the house. She already stretches out her hand to grasp the garden. She will gradually control everything. . . . "Let me raise the vegetables of a nation," says Polly, "and I care not who makes its politics."

Here we have an inspiration to return to the *modus vivendi* of the red Indian. In biology we would call it atavism; it is always an indication that progress has taken place.

But there is another and more serious reason why Charles Dudley Warner would have written otherwise to-day. He, and his contemporaries had probably never heard of a school of horticulture *for women*. Now schools of horticulture for women exist for the express purpose of educating women so that they shall not make a muss in the garden—just as law and medical schools exist so that men and women shall not "make a muss" in law and medicine—just as schools of horticulture for men aim to prevent men from making a muss in a garden—in other words, to make horticulture a profession, and not merely an occupation. This is the theme which I wish briefly to elaborate and emphasize this afternoon—*horticulture a profession*.

Superficially we all know the difference between a trade and a profession. For ex-

ample, one holds a position, not a job; he is employed by the month or year, not by the day; he earns a salary, not wages. But these are all superficial differences. There are other distinctions, significant, fundamental. May I speak briefly of two of them?

First, The Nature of the Preparation Required.—One may learn how to raise vegetables and flowers with success by beginning as gardener's helper, imitating the experienced practitioner, substituting in his absence, and thus gradually acquiring sufficient skill to proceed independently, and, in turn, pass on his information and skill to other apprentices. But, with rare exceptions, what the journeyman has learned, is all that he can pass on; like father, like son. But where is the opportunity for progress here? The history of agriculture in China, or Palestine, or with our own aborigines, gives the clear answer. There is little or no opportunity for progress. Cloth would be spun on hand looms to-day had no other factor been introduced into spinning than the instruction of daughters by mothers. This kind of instruction does not make for progress; it can never convert a trade into a profession. The spinning jenny was not invented by a spinner, nor the wireless telegraph by a telegraph operator, nor the science of agronomy by practical farmers.

Progress depends upon a fullness of preparation exceeding the limits of anticipated requirement in practise. This is why I have never liked the phrase, "teachers training class." Horses may be trained, and a well-trained horse may be depended on to do accurately and promptly the tricks that are taught him. But place him in a new situation, or confront him with a new problem, or an old one somewhat altered—and you may then learn clearly and easily the difference between training and education.

In order to become a horticulturist, as distinguished from a practical gardener, one's knowledge must exceed the anticipated demands upon it in practise. He must not only know how and when to cultivate, but why; not only the names of his plants, but the nature of plants—why leaves are green, what flowers are for, how seeds are formed, how roots absorb moisture, how plants feed, the nature of plant diseases (as well as when and how to spray), the nature and kinds of variation, the basis of selection, why some varieties tend to run out, why corn "mixes in the hill." This is the knowledge that gives power, this is the basis of progress. I do not mean that such fullness of knowledge is always necessary in order to raise good crops—to be a good gardener; but it is necessary in order to be able still to raise good crops in spite of unforeseen obstacles—the new insect or fungus pest, an excessive drought, a season of unusual weather in general; it is necessary in order to raise increasingly better crops, in order to introduce improvements in practise, in order to become a horticulturist.

Horticulture is an art, and like all arts, it is based upon certain sciences; a knowledge of these fundamental sciences is necessary—soil technology, economic entomology, the elements of botany, with special emphasis on plant physiology; something of plant pathology, the principles of plant breeding, ecology or the relation of plants to their environment; something of physics and chemistry, plant geography, and the history of cultivated plants. Moreover one should know the history of his profession, be acquainted with the classic publications, the names and lives of the founders and leading horticulturists. One can never keep abreast of the times (let alone becoming a leader) who does not keep in touch with the new and modern books, and the current periodical literature of the subject.

Membership in local and national organizations of gardeners or horticulturists is stimulating, if not essential.

And finally, one should have a hobby—one or more. Nothing is more narrowing than exclusive attention to one life-interest; nothing is more fatal to the best accomplishment; nothing so dwarfs one's soul. Years ago President Eliot, of Harvard University, tersely defined a liberal education as, "Everything of something and something of everything." The latter is almost, if not quite, as important as the former. Be horticulturists, or gardeners, or teachers of horticulture, but do not be *merely* horticulturists or teachers. Never lose sight of the fact that you are women first, horticulturists second, and that the largest success in one's lifework is quite as much a matter of breadth as of depth, of character as skill.

The second and last distinction I wish to emphasize between a trade and a profession is the personal attitude toward one's work. Why did you attend a school of horticulture? Why did you ever think you wanted to make some phase of gardening your life work? *Do you think so now*, after you have had a taste of it, or do you feel that you might, after all, be happier in some other occupation? These are vital questions; on the answers you can give to them depend your success or failure, if you persist in following the occupation for which you have been fitting yourself in this institution.

There is an occupation of gardening; there is a profession of horticulture. As I have stated above, in practise horticulture is an art; in theory it is an applied science, having a body of literature of its own, raised in its pursuit above the trammels of empiricism, yielding contributions to its own progress from within. Of all this you should aspire to be a part, not only making yourselves familiar with the literature, but

contributing thereto; not only basing your own practise on wide knowledge of fundamentals, instead of on rule of thumb, but seeking to ascertain for yourselves new principles, or new applications of old principles; not only keeping abreast of progress, but endeavoring to contribute something substantial thereto—in some small degree, at least, to be leaders.

A friend of mine, a college professor, spending a summer in New York City, rented the furnished apartment of a teacher in one of the city high schools. After he had occupied the apartment for three or four weeks he asked me if I knew what subject the high school teacher taught. I replied that I did not, but inquired whether the answer to his question might not be found in the titles to the books and magazines in the apartment. To my surprise, and to his, no such incriminating evidence could be found. So far as anything about his home might suggest, he might have been a clerk or a bookkeeper, as well as a teacher. In view of what we have been saying, the significance of this is self-evident. To all appearances, this teacher of youth possessed no library of books, and subscribed for no magazines bearing on his own calling; are we not justified in concluding that his real interests were outside the pale of his daily occupation and his chosen life work. I was sorry for him; I was still more sorry for the pupils who were obliged to sit daily under his perfunctory instruction.

What I plead for is that you shall not view the vocation of horticulture *merely* as a means of earning a living or raising plants, or the avocation of horticulture merely as a means to planting your own garden or decorating your own home grounds. Food is good and we must have it; beauty is good and we must also have it. Objects of beauty are as necessary as food to right, complete living; but you can get

more than this, even, out of the study and practise of horticulture. The dignity and worth of the human spirit is a greater good, to which all else should be made to minister.

You are graduates of a technical school. There are some who go to a technical school with no other idea than to secure training for a profession; there are indeed some who contend that technical schools are necessarily limited in their work to preparation for a vocation, and this is the danger. At about the middle of the nineteenth century the controversy was rife in England as to whether professional studies had any place in a university. Cardinal Newman argued, with all the power of his eloquence, that it is the purpose of a university to confer, not a technical, but a *liberal* education; and he defined a liberal education as consisting in the culture of the intellect for its own sake, without reference to utilitarian ends.

One can hardly overestimate the value of a liberal education, thus defined, for all, no matter what their calling in life. Every one, whether horticulturist or doctor, or lawyer or engineer—whatever his vocation—must take his place in a community of individuals of varying degrees of culture, of other interests than his own, of broad as well as of narrow outlook, and he can not do it successfully by being merely a horticulturist, or a lawyer. The position he can take, the influence for good he can yield, will depend upon his own expansion of mind, the width of his own sympathies, the breadth of his own culture.

A recent editorial in a New York daily paper called attention to the fact that the French educational mission of seven savants, now in this country, contained but one scientist, and expressed great satisfaction at this fact, as indicating the contrast between French and German culture, of the latter of which we have had enough.—*ad*

nauseam. But the repugnant and unsavory character of German culture is not to be attributed to the extensive development of scientific studies in Germany, but to the fact that her entire educational system, in the schools and out, has been permeated with an antiquated, unchristian, inhuman, abhorrent system of ethics and morality. She was rotten at the heart.

I wish to emphasize the point that liberal education is not necessarily a matter of content—of non-utilitarian subjects—but of spirit and of methods. The studies of Greek, Latin and Hebrew were at first introduced into university instruction for utilitarian purposes, but soon became the foundation stones of a liberal education. The studies of medicine, law, theology, engineering, botany, horticulture, may be pursued in such a way as to produce merely doctors, lawyers, divines, engineers, botanists, horticulturists; or they may be pursued with a spirit and method that will produce, as well, men and women of broad culture—of liberal education, more competent in their professions, more creditable and satisfactory to themselves, more valuable in their communities. Make your horticultural study, then, not only a means of preparation for a vocation, but also a basis and means of education—of the enlargement of your minds, the enrichment of your lives, the expansion and perfection of your characters.

You are entering upon a noble calling. The outstanding names in horticulture—Vilmorin (father and son) and Lemoine in France, Thomas Andrew Knight, Veitch and Sutton in England, Robert Fortune in Scotland, Van Tubergen and de Vries in Holland, Correvon in Switzerland, Henderson, Meehan, Bailey, and others in America, would do honor to any profession. You have a reputation to maintain, and an obligation to maintain it.

Moreover, horticulture is one of the later and therefore, one of the finer fruits of civilization. "When ages grow to civility and elegance," says Lord Bacon, in his essay on gardens, "men come to build stately sooner than to garden finely; as if gardening were the greater perfection." The domestication and cultivation of plants is intimately bound up with the time when men, hitherto accustomed to roam, and to depend upon a chance supply of food from wild plants and animals, first began to take up permanent abodes in communities, and therefore found it, not only convenient, but essential to have a local supply insured; yet from all we can learn of the most ancient civilizations, there were no gardens as we now know them. Culinary vegetables, for example, were raised in ancient Egypt, as we learn from inscriptions on the pyramid of Cheops, and from other sources; but while accounts of the splendor of Memphis speak of statues, temples, and palaces, no mention is anywhere made of gardens.

In his letter to Gallus, describing his Laurentian estate,² Pliny's mind is chiefly occupied with the details of his villa, and while he refers to his tennis court, to an exercise ground with a border of boxwood and rosemary, and to "a terrace walk that is fragrant with violets," mention of his garden seems quite incidental, and all we learn of it is that it "is clad with a number of mulberry and fig-trees"; in other words it does not appear to be a garden, as we understand the term, nor to loom large in the mind of its owner as one of the chief attractions of his summer home.

Even as late as the middle of the eighteenth century Horace Walpole said (in a letter to Conway), "I lament living in so barbarous an age, when we are come to so little perfection in gardening." But gardens and the domestication and cultivation

² "Letters," 1st Ser., Bk. 2, Letter XVII.

of plants, were the inevitable, logical sequence of the establishment of homes and gradually they make their appearance and begin their evolution as one of the finer expressions of civilization.

"Happy is the man who loves flowers," wrote Henry Ward Beecher, and in pleading for more effective writing in American horticultural magazines, he referred to horticulture as "this elegant department of knowledge." Not only may the study of the science itself become an avenue of culture and refinement, but a study of its origins (as a phase of agriculture), and of its historical development leads into some of the most fascinating and illuminating chapters in the history of civilization. If the artificial production of fire is conceded to be one of the greatest steps forward in the intellectual ascent of man, the domestication of wild animals and plants is second only in importance, and the historical study of this wonderful achievement has ramifications that carry one back to the very dawn of civilization, and laterally into enriching contact with archeology, ethnology, geology, plant geography, ancient and modern history, evolution, philosophy and other departments of knowledge.

We know that some of our economic plants were cultivated by the lake-dwellers of Switzerland while they were yet in the neolithic stage of culture, some three thousand years or more before the Christian Era. "Farmers of Forty Centuries" is the fascinating title of Professor King's study of the agriculture of China; that is, some of our cultivated plants—a date or a grain of rice—represent an unbroken line of living protoplasm, and of human aspiration and upward struggle, extending back some 5,000 or 6,000 years. Like any department of human knowledge, the study of horticulture, thoroughly pursued in all its vari-

ous aspects, may become the inspiration and means of a liberal education.

It is probable that the immediate future will offer unusual opportunities in horticulture as in all other fields of worth while human endeavor. The restoration of devastated Europe will not be complete until it includes the esthetic as well as the merely utilitarian. Already the call has come to this country for trained gardeners, for the Hun's conception of the exigencies of war has included the wholesale destruction of trees, parks, orchards and gardens. It is worthy of mention at this time and place that the American Horticultural Society has already collected and forwarded to France the sum of several thousand dollars to be expended in the replacing of ruined fruit trees and orchards.

The need here at home has never been greater. The truth of Lord Bacon's statement has found abundant confirmation in America, for, notwithstanding the early introduction of nurseries and horticulture in the colonies—notably by the Princes, father, son and grandson, on Long Island (1725 and later), by Bartram (1728), Evans and Humphrey Marshall near Philadelphia, by Andrew Jackson Downing ("perhaps the fairest name in American horticultural literature"), by David Hosack (1801) in New York, by M'Mahon (1800), Bloodgood (1820), Hogg (1834), Parsons (1838), Landreth (1874), Thorburn (1802), and a host of other pioneers—notwithstanding these early labors, subsequent development has been slow. But we have now passed the pioneer stage of national development, and the conditions which, for a time, justified our shortcomings in esthetics have ceased to exist; the forests are cleared, the frontier has vanished, mud huts and log cabins (mere houses) have given place to real homes. We have even managed to survive the peri-

ods of mansard roofs and brown stone fronts, and our villages and cities have already begun to recognize the value of horticulture and landscape gardening in making centers of business places of beauty as well.

See your vocation, then, in broad perspective—in its relation to the sum total of things; to social needs, spiritual needs, civic needs, human needs—the development of your own character, of a more refined and cultured national character. We are living in one of the most, if not the most momentous period in human history. It is a wonderful privilege to be alive now—to be a part of all that is transpiring, to be entering now upon one's life work. Never has there been a greater need for the best in all things. The self-revelation of the unspeakable Hun has left us with a feeling of disgust, as if we had been in contact with something base and unclean, as indeed we have; and the need was never so urgent as now for an increase of knowledge and the wide diffusion of truth and of spiritual and material beauty. It is your function and privilege to cooperate with the architect, the landscape architect, the town planner, in making beautiful the habitations of men.

There are those to-day who are crying aloud in the land that the work before us of educational reconstruction shall be characterized by making everything primarily or even exclusively "practical"—by choosing our studies and placing our emphasis chiefly with reference to bread-and-butter considerations. This is the great danger ahead of us in our program of education; it is quite as unfortunate to lose sight of the ideal as to forget the material needs of life. A Brooklyn divine has tersely said that, in hitching his wagon to a star, the idealist has chiefly in mind the star, while the administrator—the man of affairs—has chiefly in mind the wagon. Hitch your wagon to a

star, by all means, in horticulture, but do not lose sight of either the wagon or the star.

Are you really interested in this work—in some phase of horticulture? If you are not, I commiserate you on the time you have spent at this school; if you are, I am glad to extend to you the most hearty congratulations and good wishes on the completion of your course here, and the commencement of the larger and more serious work upon which you are about to enter.

C. STUART GAGER

BROOKLYN BOTANIC GARDEN

LETTER ON THE SMITHSONIAN
INSTITUTION¹

BY THE LATE PROFESSOR LOUIS AGASSIZ

Addressed to the Honorable Charles W. Upham

Dear Sir,—Every scientific man in this country has been watching with intense interest the proceedings of the Smithsonian Institution ever since its foundation, satisfied, as all must be, that upon its prosperity the progress of science in America in a very great measure depends. The controversies which have been lately carried on respecting the management of the institution have increased the solicitude of its friends with regard to its future prospects in a degree which can hardly be realized by those who are not immediately connected with the cause of science.

As a foreigner, who has enjoyed but for a few years the privilege of adding his small share to support the powerful impulse which scientific investigations have lately received from those who are the native representatives of science in America, I have thus far abstained from taking any part in this discussion, for fear of being charged with meddling with matters in which I have no concern. There is, however, one feature of the institution itself, which may, I trust, justify the step

¹ From *Canadian Journal*, Vol. III., 1854 and 1855, pp. 216–217, in the April number for 1855, containing Proceedings of the Canadian Institute. Communicated by Dr. Otto Klotz, Dominion Observatory, Ottawa, Canada.

I have taken in addressing you upon this subject as the chairman of the committee elected by the House of Representatives to investigate the proceedings of that establishment.

With the exception of a few indirect allusions, I do not see that any reference is made in the discussion now going on to the indisputable fact that the Smithsonian Institution is not an American institution. It was originated by the liberality of a high-minded English gentleman, intrusting his fortune to the United States to found in Washington an institution *to increase and diffuse knowledge among men*. America, in accepting the trust, has obtained the exclusive management of the most important and the most richly endowed scientific institution in the world: but it is at the same time responsible to the scientific world at large for the successful prosecution of the object of the trust, which is to *increase and diffuse knowledge among men*.

Were it not for this universal character of the institution, I would not think it becoming in me to offer any suggestion with regard to it. As it is, I feel a double interest in its prosperity—in the first place, as an institution designed to foster the process of science at large, and without reference to nationalities or local interests, and next, as more immediately connected with the advancement of science in the country of my adoption.

The votaries of science may differ in their views about the best means of advancing science, according to the progress they have themselves made in its prosecution; but there is one standard of appreciation which can not fail to guide rightly those who would form a candid opinion about it. I mean the lives of those who have most extensively contributed in enlarging the boundaries of knowledge.

There are two individuals who may, without qualification, be considered the most prominent scientific men of the nineteenth century—Cuvier and Humboldt. By what means have they given such powerful impulse to science? How have they succeeded not only in increasing the amount of knowledge of their age, but also in founding new branches of science? It is by their own publications and by aiding